CALIBRATION STANDARD REQUIREMENT

FOR A

LOGIC ANALYZER

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PROCUREMENT PACKAGE

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July 1995
Encl (1)

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LOGIC ANALYZER/DIGITAL OSCILLOSCOPE

1.    SCOPE

1.1    Scope.    This  requirement  defines  the  mechanical,  electrical,  and
electronic characteristics for a Logic Analyzer.  This equipment is intended
to be used by Navy personnel in shipboard and shorebased laboratories.  For
the purposes of this requirement, the Logic Analyzer shall be referred to as
the Analyzer.

2.  APPLICABLE DOCUMENTS

2.1    Controlling Specifications.  MIL-T-28800, "Military Specification, Test
Equipment  for  use  with  Electrical  and  Electronic  Equipment,  General
specification for," and all documents referenced therein of the issues in
effect on the date of this solicitation shall form a part of this requirement.

3.  REQUIREMENTS

3.1    General.  The Analyzer shall conform to the Type II, Class 5, Style E
requirements as specified in MIL-T-28800 for Navy shipboard and shorebased use
as  modified  below.   The  use  of  material  restricted  for  Navy  use  shall  be
governed by MIL-T-28800.

3.1.1    Design and Construction.   The Analyzer design and construction shall
meet the requirements of MIL-T-28800 for Type II equipment.

3.1.2    Power  Requirements.   The  Analyzer  shall  operate  from  a
source of 103.5V to 126.5V, at 60 Hz ±5% single phase input power
as specified in MIL-T-28800.

3.1.2.1    Fuses or Circuit Breakers.  Fuses  or  circuit  breakers
shall  be  provided.   If  circuit  breakers  are  used,  both  sides  of
the  power  source  shall  be  automatically  disconnected  from  the
equipment  in  the  event  of  excessive  current.    If  fuses  are  used,
only  the  line  side  of   the   input  power  line  as  defined  by  MIL-C-
28777 shall be fused.   Fuses or circuit breakers shall be readily
accessible.

3.1.2.2    Power Connections.  The  requirements  for  power  source
connections  shall  be  in  accordance  with  MIL-T-28800  with  a  6  foot
minimum (1.8 m) length cord.

3.1.3    Dimensions and Weight. The maximum dimension of the Analyzer shall not
exceed   19  inches  (48.3  cm)  in  width,  9  inches  (23  cm)  in  height,  18  inches
(46 cm) in depth.   The  weight of the Analyzer shall not exceed 30 pounds (14
kg).

3.1.4  Lithium Batteries.  Per MIL-T-28800, lithium batteries are prohibited without prior authorization.  A request for approval for the use of lithium batteries, including those encapsulated in integrated circuits, shall be submitted to the procuring activity at the time of submission of proposals.  Approval shall apply only to the specific model proposed.

3.2  Environmental Requirements.  The Analyzer shall meet the environmental requirements for a Type II, Class 5, Style E equipment with the deviations specified below.

3.2.1  Temperature and Humidity.  The Analyzer shall meet the conditions below:

|  | Temperature($^{o}$C) | Relative Humidity (%) |
|---|---|---|
| Operating | 10 to 30 | 95 |
|  | 30 to 40 | 75 |
| Non-operating | -40 to 70 | Not Controlled |

3.2.2  Electromagnetic Compatibility.  The electromagnetic compatibility requirements of MIL-T-28800 are limited to the following areas:  CE01, CE03, CS01, CS02 (0.05 to 100 MHz), CS06, RE01 (back panel search excluded), RE02 (14 kHz to 1 GHz), and RS03.

3.3  Reliability.  Type II reliability requirements are as specified in MIL-T-28800.

3.3.1  Calibration Interval.  The Analyzer shall have an 85% or greater probability of remaining within tolerances of all requirements at the end of a 12 month period.

3.4  Maintainability.  The Analyzer shall meet the Type II maintainability requirements as specified in MIL-T-28800 except the lowest discrete component shall be defined as a replaceable assembly.  Certification time shall not exceed 60 minutes.

3.5  Performance Requirements.  The Analyzer shall provide the following capability as specified below.  Unless otherwise indicated, all requirements shall be met following a 30 minute warm-up period.

3.5.1  Input Channels.

3.5.1.1  Number of Channels.  The Analyzer shall have at least 16 channels.

3.5.1.2  Maximum Input Voltage.  The channel maximum input voltage shall be at least ±40 V peak to peak.

3.5.1.3  Dynamic Range.  The Analyzer shall have a dynamic range at least ±10 V about threshold.

3.5.1.4  Minimum Input Voltage.  The channel minimum input voltage shall be 500 mV or less peak to peak about threshold.

3.5.1.5  Threshold Setting.  The threshold level of the Analyzer shall be assigned to the input channels and external trigger.

3.5.1.5.1  Threshold Range.  The threshold range of the Analyzer shall be variable from at least -6.0 V to +6.0 V.

3.5.1.5.2  Threshold Accuracy. The threshold accuracy of the Analyzer shall not exceed ±(3% of setting + 100 mV).

3.5.1.6  Channel to Channel Skew.  The channel to channel skew of the Analyzer shall not exceed 3.0 ns.

3.5.1.7  Input Impedance.  The input impedance of the Analyzer shall be at least 100 k( in parallel with less than 8 pF.

3.5.2  Horizontal System.

3.5.2.1  Horizontal Sweep Speeds.  The horizontal sweep speed of the Analyzer shall be at least from 500 ms/div. to 10 ns/div. for main and delayed sweep.

3.5.2.1.1  Sweep Speed Accuracy.  The sweep speed accuracy of the Analyzer shall be at least 0.01% of reading for main, delayed sweeps, and vernier.

3.5.2.1.2  Horizontal Modes.  The Analyzer shall have the following horizontal modes: main, main and delayed, and post acquisition pan and zoom.

3.5.2.2  Cursor Accuracy.  The cursor accuracy of the Analyzer shall not exceed the following:

    ±(sample period + 0.01% of reading + 0.2% of screen width), for single channel.

    ±(sample period + Ch to Ch skew + 0.01% of reading + 0.2% of screen width), for dual channel.

3.5.2.3  Delay.  The delay shall be at least 262,144 times the sample period to a maximum of at least 100s.

3.5.2.4  Delayed Sweep Operation.  The delayed sweep operation of the horizontal system shall be at least 2 x main sweep and shall be as fast as 5 ns/div.

3.5.2.5  Post Acquisition Pan and Zoom Operation.  The Analyzer shall have capability to acquire waveforms that are panned across the display and/or expanded for enhanced viewing.

4

3.5.3  <u>Acquisition System</u>.

3.5.3.1  <u>Sample Rate Resolution</u>.  The sample rate resolution shall be  a single bit or less.

3.5.3.2  <u>Record Length</u>.  The record length of the Analyzer shall be at least 1,000 samples.

3.5.3.3  <u>Glitch Detect</u>.  Minimum detectable glitch shall be 5 ns or less.

3.5.4  <u>Trigger System</u>.  All channels of the Analyzer shall be able to trigger the analyzer.

3.5.4.1  <u>Auto Operation</u>.  The Analyzer shall have an auto trigger operation that will produce a free running display if the trigger is not found.

3.5.4.2  <u>Modes</u>.  The Analyzer shall trigger on edge, pattern, or combined modes.

3.5.4.2.1  <u>Edge</u>.  The Analyzer shall trigger on the edge of channels 0-15 and external trigger input. The edge shall be either rising or falling.

3.5.4.2.2  <u>Pattern</u>.  The Analyzer shall trigger on a pattern of high, low, and don't care levels on all of the channels and external trigger input.

3.5.4.2.3  <u>Combined</u>.  The Analyzer shall trigger on a combination of pattern and edge terms combined with operators.

3.5.5  <u>External Trigger</u>.

3.5.5.1  <u>Input Impedance</u>.  The external trigger input impedance shall be 1 M( in parallel with no more than 12 pF.

3.5.5.2  <u>Maximum Input Voltage</u>.  The maximum input voltage of the external trigger shall be at least ±40 V peak to peak.

3.5.5.3  <u>Trigger Threshold</u>.  The threshold range of the external trigger shall be variable from at least -6.0 V to +6.0 V.

3.5.5.4  <u>Threshold Accuracy</u>. The threshold accuracy of the external trigger shall not exceed ±100 mV or 6% of setting whichever is greater.

3.5.6  <u>Display System</u>.

3.5.6.1  <u>Display Resolution</u>.  The display resolution shall be at least 256 vertical by 500 horizontal points.

3.5.6.2  <u>Display Controls</u>.  The Analyzer shall have a front panel intensity control.

3.6  <u>Operational Requirements</u>.

3.6.1  <u>Front Panel Control Requirements</u>.  All modes and functions shall be operable using front panel controls.  The locations and labeling of indicators, controls, switches shall provide for maximum clarity and easily understood operation without reference to tables, charts, or flow diagrams.

3.6.2  <u>Self-Test.</u>  The self test shall comprise two selectable levels, an operational test to determine if the instrument is operationally ready, and a second level diagnostic test to diagnose and isolate faulty field replaceable modules.  When the self test function is initiated, an auto sequenced internal operation test shall be performed.  The diagnostic test shall be selectable only by deliberate operator command.

3.7  <u>Manual</u>.  At least two copies of an operation and maintenance manual shall be provided.  The manual shall meet the requirements of MIL-M-7298.

3.7.1  <u>Calibration Procedure</u>. The manual shall provide a Analyzer calibration procedure in accordance with MIL-M-38793.